Understanding and Addressing Barriers to Implementation of Environmental and Policy Interventions to Support Physical Activity and Healthy Eating in Rural Communities

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Abstract

PURPOSE—Rural residents are at greater risk of obesity than urban and suburban residents. Failure to meet physical activity and healthy eating recommendations play a role. Emerging evidence shows the effectiveness of environmental and policy interventions to promote physical activity and healthy eating. Yet most of the evidence comes from urban and suburban communities. The objectives of this study were to 1) identify types of environmental and policy interventions being implemented in rural communities to promote physical activity or healthy eating, 2) identify barriers to the implementation of environmental or policy interventions, and 3) identify strategies rural communities have employed to overcome these barriers.

METHODS—Key informant interviews with public health professionals working in rural areas in the United States were conducted in 2010. A purposive sample included 15 practitioners engaged in planning, implementing, or evaluating environmental or policy interventions to promote physical activity or healthy eating.

FINDINGS—Our findings reveal that barriers in rural communities include cultural differences, population size, limited human capital, and difficulty demonstrating the connection between social and economic policy and health outcomes. Key informants identified a number of strategies to overcome these barriers such as developing broad-based partnerships and building on the existing infrastructure.

CONCLUSON—Recent evidence suggests that environmental and policy interventions have potential to promote physical activity and healthy eating at the population level. To realize

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positive outcomes, it is important to provide opportunities to implement these types of interventions and document their effectiveness in rural communities.

Keywords

healthy eating; obesity; physical activity; qualitative research; rural health

The prevalence of overweight and obesity in the United States rose steadily over the last 3 decades. Currently, although high, the rate appears to have stabilized. Approximately one-third of adults and 17% of children in the United States are obese.[1,2] The rise in obesity has varied by geographic location. Initially, rural areas did not experience the rapid increase in obesity experienced by urban and suburban areas. Some believe the traditional agrarian lifestyle, which involved intense physical labor, provided some initial protection for rural populations.[3] Studies in the last decade, however, report that children and adults currently living in rural communities are more likely to be overweight or obese than their counterparts in metropolitan areas.[4,5]

A number of factors may place rural individuals at greater risk of obesity. Rural areas have higher poverty rates and lower income levels than urban and suburban areas.[6] Research shows that obesity follows a social gradient such that those who are poor are more likely to be obese.[7] Rural residents are also less likely to meet recommendations for physical activity and nutrition, 2 important behavioral determinants of obesity.[8–10] Failure to meet the recommendations is due to a number of different factors that span the ecological model. For example, at an individual level, rural residents have limited exposure to preventive health care messages.[11] Rural residents also have limited access to safe, walkable communities, recreation facilities, parks, and healthy food outlets.[11–13] All of these are important environmental determinants of physical activity or health eating.

Interventions designed to span the different levels of the ecological model have the potential to create sustainable change to reduce obesity.[14] Recently, intervention efforts have focused on the environmental and policy levels of the ecological framework.[15,16] These interventions are seen as important because they go beyond advising individuals what they should do to creating the structures that make healthy choices possible. For example, changing policies related to built environments is one mechanism to influence physical activity.[17] Strategies to alter the built environment include safe routes to school and complete sidewalks and bicycle paths to allow safe travel.[18] Promising environmental and policy strategies to support availability of healthy food options and encourage healthy nutrition choices in schools include improving the nutritional quality of food, providing healthier options for snacks, encouraging Farm to School programs to support local produce, and enhancing school wellness policies.[19,20] Promising community-wide environmental and policy changes include expanding the purchasing power of the federal Women, Infants, and Children Program (WIC), providing incentives to stores for offering healthier options, and sustaining farmers markets.[19] Successful implementation of these types of interventions calls for the formation of partnerships, advisory boards, and coalitions to bring stakeholders together to promote environmental and policy change that supports healthier lifestyles.[19]

While there is great reason to believe that creating infrastructures to make healthy choices possible is likely to make a difference in rural areas, much of the evidence to date on environmental and policy change related to physical activity and healthy eating comes from suburban and urban areas.[21,22] Adapting evidence to a rural setting is challenging based on characteristics of the built environment, social norms, and cultural practices unique to rural settings.[12]

Given the paucity of research on interventions to promote physical activity and healthy eating in rural settings, the research team conducted interviews with key informants who are planning, implementing and evaluating environmental and policy interventions in rural areas across the United States. This paper reports the findings from these interviews, with the objectives of identifying 1) the types of environmental and policy interventions being implemented in rural communities, 2) barriers to the design, implementation or evaluation of environmental or policy interventions to promote physical activity and/or healthy eating in rural communities, and 3) strategies rural communities have employed to overcome these barriers.

METHODS

Methods were used that recognize the wealth of information that can be collected via interviews with "key informants" (*aka*, opinion leaders) who are knowledgeable about uses of evidence and what works in prevention of obesity. Key informants often have important and unique information about a program[23] and key informant information is particularly useful in the early to middle phases of a project.[24] A key informant for this study was defined as an individual participating in the planning, implementation or evaluation of an environmental or policy intervention to promote physical activity or health eating in a rural community.

Participants were identified through literature searches, websites (eg, Active Living by Design, Prevention Institute), and professional networks (eg, Rural Active Living Network). Snowball sampling was also used to identify additional key informants since the network of people engaged in this type of work is still emerging. Initially, participants were invited via e-mail to participate in the interviews. Then, follow-up telephone calls were made to schedule interviews with those who responded to the initial e-mail. Key informants were included if they led efforts to use environmental or policy interventions to improve physical activity and eating habits of rural populations.

The research team conducted 15 key informant telephone interviews with public health practitioners across the United States in spring 2010. However, only 13 key informant interviews were included in the analysis. Two of the key informants were excluded because they provided technical assistance or advocacy knowledge to intervention efforts but did not participate in change efforts at the local level.

All key informants held positions with nonprofit or local government agencies. Key informants represented communities in 10 states including Colorado, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New York, North Carolina, Oregon, and

Wyoming. Key informants self-identified as working in low-income, rural communities. Key informants reported county population sizes between 6,000 to 80,000 people. Definitions of rural vary[25] and a standard definition of rural for the purpose of health research has not been determined.[26] The US Census defines urban clusters as census block groups with a population density of 1,000 people per square mile and notes that rural areas include all those that are not considered urban clusters.[26] Participants provided information on the population size of their county, which takes into account a larger geographic area than the US Census defines.

The key informant interviews lasted approximately 60 minutes (range between 45 and 75 minutes, average of 50 minutes). The development of the interview protocol was guided by dissemination and implementation theory.[27–29] The participants were asked to describe their community (eg, location, population, health issues) and the environmental or policy intervention developed to address physical activity and healthy eating. In addition, participants were asked about key partners, barriers and facilitators to implementation, evaluation, sustainability, and dissemination of the change. Participants received a $15 gift card to acknowledge their time for participating in the telephone interviews. Saint Louis University Institutional Review Board approved this study.

Each key informant interview was audio-taped with the permission of the participants. Project staff transcribed the tapes verbatim. Each transcript was reviewed for errors and corrected before beginning analysis. Coders began the coding process with a code start list, a technique commonly used in focused coding.[30] The start list was created based on the interview protocol (eg, partners, barriers). Code definitions were determined by the coders to provide a common understanding of the codes.[31] Codes were revised during coding meetings when an inconsistency occurred. The transcripts were coded by an initial coder and reviewed by a second coder, both of whom had been trained in qualitative methods. This approach is commonly used to enhance credibility because it challenges the initial coder's biases and challenges the coders to draw common conclusions supported by data.[32] After coding was checked for appropriateness, reports were subsequently generated to identify all quotes assigned to each code and determine the fit of the quotation within the code.[31] All coding decisions were documented to provide a record of the data analysis process.[31,32]

RESULTS

Community Description

The key informants described their populations as predominately Caucasian, noting, however, that racial/ethnic diversity was growing in their rural areas. Some attributed a rise in Hispanic population to the agricultural work opportunities available in rural communities. Two key informants worked in counties that have large Native American populations. Many of the key informants stated that income levels for individuals in their rural areas are lower than urban averages and state rates. Key informants reported county overweight and obesity rates that are much higher than national rates. Research validates these self reports.[4,5]

Environmental and Policy Change

Each key informant was asked to describe the intervention(s) to promote physical activity or healthy eating being planned, implemented or evaluated in their community. Twelve of the 13 key informants reported involvement with at least one environmental or policy intervention related to physical activity. One key informant focused on healthy eating interventions only. The informants identified several settings in which these interventions took place including communities, schools, and worksites. In total, key informants listed 37 environmental or policy interventions related to physical activity that were being planned or implemented (Table 1). Creation and expansion of walking trails was the most commonly cited environmental intervention identified (9 sites). Sidewalk policies (5 sites), Safe Routes to School (5 sites), and bicycling-related policies (4 sites) were other common environmental and policy interventions mentioned. Sidewalk policies mentioned included sidewalk improvements and complete street policies (eg, sidewalk connectivity). Examples of bicycle policies included creation of bicycle lanes and enhanced bicycle facilities (eg, bicycle racks on public buses). As reflected in Table 1, sites may have been engaged in more than one intervention in a category; for example, 2 different bicycle-related interventions.

Key informants were less likely to report environmental or policy interventions to promote healthy eating. Only 7 of the 13 key informants reported interventions to promote healthy eating with 21 total environmental or policy interventions named (Table 1). Environmental and policy interventions to promote healthy eating primarily took place in school and community settings. Of those reporting changes to promote healthy eating, 4 informants reported interventions in the school setting. One key informant reported that her community was implementing multiple interventions to change the school food environment. Interventions within school environments included gardens (1 site), community supported agriculture or local foods offered in schools (2 sites), menu boards at schools (1 site), changes to vending machines (2 sites), and improving school lunches (1). In terms of interventions within the community, 4 key informants reported planning or implementing community gardens while 4 key informants reported developing or supporting farmers' markets. Other environmental or policy changes reported included improving the nutritional value of food offered at summer recreation programs and healthy options offered at community events.

Barriers to Environmental and Policy Change

As noted, little has been published in the literature about environmental or policy change to promote physical activity or healthy eating in rural communities. One of the main objectives of this study was to identify lessons learned from rural communities planning, implementing, and/or evaluating these types of interventions. Understanding the barriers inherent in this type of work in rural communities is key to understanding how to adapt interventions that change environments and support healthy behavior. The barriers presented in this paper are those that participants noted were specific to rural communities. Supporting quotations appear in Table 2.

Population Size—In part, rural communities are defined by smaller population sizes. Small population size presents unique challenges to planning, implementation and

evaluation of environmental and policy change. Key informants identified a number of barriers due to population size. For example, one key informant said that small population size does not interest funders. The informant explained this may be due to a smaller population impact than may be experienced in an urban community with a denser population. One participant noted that without external funding the local public health department "did not have anyone that was funded specifically to focus on nutrition, physical activity, or obesity." This becomes a significant barrier given that participants noted that rural communities do not have a sufficient tax base to support a "planning department" or a "recreation department" that can help to support environmental or policy change. The limitation of small population size not only affects planning, implementation, and evaluation; it also affects advocacy for these types of changes. One participant noted that small population size also limits influence on state policy. The participant highlighted the importance of having state policies to encourage and support rural initiatives, but stated, "We don't have a lot of influence when it goes to the state level if we're trying to influence state policies because we're such small communities."

Human Capital—A second challenge perhaps related to population size is human capital. Generally, participants noted that staff members are "spread too thin." One participant noted that there are "no experts" in his area to explain, for example, how transportation budgets affect environmental and policy change for physical activity. Another participant explained that some rural communities lack staff with education and formal training, especially related to issues like the built environment or promotion of worksite wellness.

Culture—Priorities of rural communities may be an additional barrier to environmental and policy change to support physical activity and healthy eating. One participant explained that some people in her community have a hard time supporting funding for programs (eg, "school lunch programs") that they do not see as the "government's role." Other participants explained that walking and bicycling are not funding priorities. One participant noted "walking and bicycling are seen as amenities, not necessities. Any kind of bike trail really is seen on a much lower level, priority level, than a decent street for trucks to drive on."

Evidence From Urban and Suburban Contexts—To date, much of the research on environmental and policy interventions to support physical activity and healthy eating has been conducted in urban and suburban areas. The participants identified adapting evidence to fit rural areas as a barrier to this work. One participant explained "so much of the strategies that have been put together have been put together with the urban landscape in thought." One participant gave an example explaining the employment opportunities are located on the edge of town and commuting to work is not a "walkable community kind of experience" as it may be in urban areas.

Leadership—Although not limited to rural areas, participants noted that it is challenging to get leaders to understand there is a connection between social and economic policy and health. One participant noted that city planning staff "don't believe necessarily that infrastructure change and policy change is the way to get people to bike and move more."

Another participant explained that it is difficult to get public officials to think differently about how policy could promote a community where "people are more active."

Strategies to Overcome Barriers to Environmental and Policy Change

The key informants discussed at length the difficulties of planning and implementing environmental and policy interventions in rural areas. The key informants, however, were optimistic and identified a number of strategies for overcoming these barriers. Supporting quotations appear in Table 3.

Develop a Broad-Based Partnership—All of the participants identified the role of partnership or collaboration. Participants noted that developing partnerships or collaborations with the right people was necessary. See Table 4 for a list of commonly identified partners. The participants noted that it is important to use existing networks and build on the work that is already being done, identify new partners through referrals, and facilitate partnerships with non-traditional partners. For example, one respondent said they used an emerging partnership with the arts community to advocate for trails. The key informant explained "they [the arts community] were really supportive of it and became really great trail advocates." Participants noted that for partnerships to be effective there needs to be an environment of collaboration. Participants suggested identifying your partners' areas of interest and developing a broad-based approach that meets multiple needs. In addition, a participant noted that to build a strong partnership to implement environmental and policy interventions for nutrition and physical activity you must educate both partners and the wider community about "why we are doing this" and "what the changes will mean."

Build on What Currently Exists—In addition to building a strong partnership, participants noted the importance of building on what currently exists. Participants noted that it is important to learn what development plans or ordinances are currently in place and identify ways to connect to those. For example, the participants noted that, although rarer in rural communities, some communities have Smart Commute plans or facilities like YMCAs that can serve as a starting point.

Become the Expert—An important strategy key informants identified is to position your partnership or organization to be an asset to the city or county. One participant noted that the city looks to their organization as a leader in environmental change. He stated that when a new development is proposed they seek his input on the design plans. Another participant explained that this [the expertise within their organization] can help to sustain the effort when changes in public leadership occur.

Focus on the Long-Term Vision—The participants suggested that one way to be recognized as a leader is by inspiring people to think about the long-term vision for the community rather than focus on money. The participant suggested that a conversation be started by saying the following: "We understand that it takes money today, but what we want you to start to think about is, what do we need 20 years from now? What do we want our town to look like 20 years from now?"

DISCUSSION

One goal of Healthy People 2020 is to eliminate differences in obesity due to geographic location.[33] Using evidence-based public health strategies is vital if the nation is to achieve this goal. Evidence-based strategies are those that have been identified as effective through scientific evidence and include information on the adaption and translation of an effective intervention from one population or setting to another.[34] Yet, as noted, there is limited evidence on what environmental and policy interventions work in rural areas. Further, adapting evidence to a rural setting can be challenging given characteristics of the built environment, social norms, resources, and cultural practices unique to rural settings.[12]

This paper describes the types of environmental and policy interventions that are occurring in rural communities, the barriers identified by practitioners working in rural communities to implement these interventions to promote physical activity and/or healthy eating, and the strategies used to overcome these barriers. Some identified barriers are similar to those in other geographic locations. For example, cost is a concern of many local communities in urban and suburban areas attempting to make similar changes (eg, bicycle lanes or walking trails).[35] Others, such as small population size, are unique to rural areas. Surprisingly, although asked to identify strategies that rural communities can use to overcome barriers, the participants identified strategies applicable for urban and suburban communities as well. Nevertheless, the findings from this study suggest a few recommendations for rural communities seeking to engage in this type of work.

First, communities need to understand their specific needs and determine if an environmental and policy intervention is the most appropriate next step. Often the first step in the evidence-based decision-making process is a community assessment. A community assessment allows a community to a) identify a problem, b) identify what is currently being done to address the problem, c) determine the feasibility of various changes, and d) inform a strategy to address specific barriers (eg, cultural, political) to these types of changes in their community.[36] As reflected in the responses of the key informants included in this study, each rural community noted unique assets (eg, access to a riverway) and unique barriers (eg, weather) to the promotion of physical activity or healthy eating. Given these unique assets and barriers, each may identify a different evidence-based environmental or policy intervention appropriate for their community.

A community assessment can also help practitioners to identify key players in their communities and regions. The key informants of this study identified various types of community partners that were helpful in the process. Specifically, key informants mentioned the need to engage government representatives at multiple levels (eg, state, county), especially in cases where an intervention will require cooperation or coordination from multiple municipalities. An essential step in engaging partners, most notably those that may not see environmental or policy change to promote physical activity or healthy eating as a priority, is to provide data about the effectiveness of these kinds of changes and their potential health impact. Identifying plans or policies that a community has in place can provide a solid starting point.

Another recommendation focuses on how to address low population density when designing interventions to promote healthy and active rural communities. One challenge noted by participants is that small population size makes it more difficult to attract outside funding for these interventions. Public health practitioners may need to address small population size and limited resources by capitalizing on regional resources that maximize the likelihood of implementing environmental and policy change in rural communities. This may include sharing resources and training opportunities to enhance the capacity of smaller communities to participate in these types of interventions. Regional opportunities, such as trainings, should take into account limited resources in individual rural communities while acknowledging the diversity of various rural populations within a geographic region. One environmental or policy intervention may not fit all communities.

The last recommendation this study suggests is to document the effectiveness of environmental or policy interventions to promote physical activity or healthy eating being implemented in rural communities, with an emphasis on so-called "contextual evidence." This need for more effectiveness research can be illustrated in the CDC's strategies for obesity prevention where only 2 of 24 intervention approaches (ie, greater availability of supermarkets, school physical education programs) make specific note of the need for or the effectiveness of these interventions in rural settings.[37] One challenge for building evidence in rural communities is that small sample sizes often lack statistical power and threaten anonymity of participants, thus limiting the understanding of an intervention's effectiveness.[38,39] This limitation may deter potential funders, which in turn limits an ability to build an evidence base for effective strategies in rural communities. As a result of this shortage of evidence, policies and programs tested in urban or suburban areas, often, are made to fit rural areas.[39] Documenting contextual evidence is therefore essential to better understand what works in rural communities. Several authors have described an evidence-based process that takes into account 3 types of evidence.[34,40] Types 1 and 2 identify a public health problem and document the impact of specific interventions to provide guidance about what should be done to address the problem. Type 3 evidence provides insight into how interventions need to be adapted and translated to fit various contexts, thus providing insight into the way an intervention may need to be adapted to accommodate the cultural, environmental, or political differences of a community. As rural communities attempt to adapt interventions that have been effective in other locales, it is imperative to document type 3 evidence. This may call for special funding initiatives to build the evidence about environmental and policy interventions to promote physical activity and healthy eating in rural areas.

There are 2 limitations worth noting. Although the research team attempted to get broad representation from across the country, the sample was not inclusive of all geographic regions. Thus, generalizabilty of these findings is limited to areas with similar geographic characteristics. Political climate, culture, and public health capacity are different in each rural area. Therefore, context-specific considerations should be taken into account when applying these findings and recommendations. It is also important to note that what respondents report doing may not be reflective of environmental or policy interventions that have been proven effective.

A key informant was defined as an individual participating in the planning, implementation or evaluation of an environmental or policy intervention to promote physical activity or health eating. Thus, the findings capture barriers specific to those already engaging in this type of work. It does not address barriers many rural areas may face prior to engaging in this type of intervention. A more comprehensive understanding of the barriers rural areas face to engage in environmental or policy change is needed.

CONCLUSION

There are numerous national and international efforts to review evidence on effective interventions and create opportunities to implement and evaluate environmental and policy interventions to promote physical activity and health eating.[41–44] While emphasis has been given to building evidence in large population subgroups (eg, urban areas) and high-risk populations (eg, low-income, minority communities), there has been sparse special attention to building evidence in rural settings.[19] An important next step in obesity prevention is to understand how to adapt effective environmental and policy interventions in rural settings. This study suggests that to translate effective interventions in rural communities, there will need to be special emphasis placed on building tertiary evidence in rural communities about which environmental and policy interventions are most effective at promoting physical activity and healthy eating given a rural context.

Acknowledgments

References

1. Ogden, CL.; Carroll, MD. Division of Health and Nutrition Examination Surveys. Atlanta, GA: Centers for Disease Control and Prevention; 2010. Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008.

2. Ogden, CL.; Carroll, MD. Division of Health and Nutrition Examination Surveys. Atlanta, GA: Centers for Disease Control and Prevention; 2010. Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963–1965 Through 2007–2008.

3. National Advisory on Rural Health and Human Services. The 2005 Report to the Secretary: Rural Health and Human Service Issues. Available at ftp://ftp.hrsa.gov/ruralhealth/NAC2005.pdf. Accessed November 1, 2011

4. Lutfiyya MN, Lipsky MS, Wisdom-Behounek J, Inpanbutr-Martinkus M. Is rural residency a risk factor for overweight and obesity for U.S. children? Obesity. 2007; 15:2348–2356. [PubMed: 17890504]

5. Jackson JE, Doescher MP, Jerant AF, Hart LG. A national study of obesity prevalence and trends by type of rural county. J Rural Health. 2005; 21(2):140–148. [PubMed: 15859051]

6. Economic Research Service. Rural America at a Glance. Washington, DC: USDA; 2010.

7. Drewnowski A. Obesity, diets, and social inequality. Nutrition Reviews. 2009; 67(1 suppl1):S36–S39. [PubMed: 19453676]

8. Lutfiyya NM, Chang LF, Lipsky ML. A cross-sectional study of US rural adults' consumption of fruits and vegetables: Do they consume at least five servings daily? BMC Public Health. 2012 Forthcoming.

9. Parks SE, Housemann RA, Brownson RC. Differential correlates of physical activity in urban and rural adults of various socioeconomic backgrounds in the United States. J Epidemiol Community Health. 2003; 57(1):29–35. [PubMed: 12490645]

10. Martin SL, Kirkner GJ, Mayo K, Matthews CE, Durstine JL, Hebert JR. Urban, rural, and regional variations in physical activity. J Rural Health. 2005; 21(3):239–244. [PubMed: 16092298]

11. Murimi MW, Harpel T. Practicing Preventive Health: The Underlying Culture Among Low-Income Rural Populations. J Rural Health. 2010; 26(3):273–282. [PubMed: 20633096]

12. Hennessy E, Kraak VI, Hyatt RR, et al. Active living for rural children: community perspectives using PhotoVOICE. Am J Prev Med. 2010; 39(6):537–545. [PubMed: 21084074]

13. Moore J, Jilcott S, Shores K, Evenson K, Brownson R, Novick L. A qualitative examination of perceived barriers and facilitators of physical activity for urban and rural youth. Health Education Research. 2010; 25(2):355–367. [PubMed: 20167607]

14. Story M, Kaphingst K, Robinson-O'Brien R, Glanz K. Creating health food and eating environments: policy and environmental approaches. Annu Rev Public Health. 2008; 29:253–272. [PubMed: 18031223]

15. Sallis JF, Glanz K. Physical activity and food environments: solutions to the obesity epidemic. Milbank Q. 2009; 87(1):123–154. [PubMed: 19298418]

16. Brownson RC, Haire-Joshu D, Luke DA. Shaping the context of health: a review of environmental and policy approaches in the prevention of chronic diseases. Annu Rev Public Health. 2006; 27:341–370. [PubMed: 16533121]

17. Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. Annu Rev Public Health. 2006; 27:297–322. [PubMed: 16533119]

18. Robert Wood Johnson Foundation. Making a case for active living communities. Am J Public Health. 2003; 93(9):1386–1388. [PubMed: 12948948]

19. Prevention Institute, Healthy Eating Active Living Convergence Partnership. Promising Strategies for Creating Healthy Eating and Active Living Environments. Oakland, CA: Convergence Partnership; 2008.

20. Parker, L.; Burns, AB.; Sanchez, E., editors. Local Government Actions to Prevent Childhood Obesity. Washington, DC: National Academies Press; 2009.

21. Frost SS, Goins RT, Hunter HR, et al. Effects of the built environment on physical activity of adults living in rural settings. Am J Health Promot. 2010; 24(4):267–283. [PubMed: 20232609]

22. Yousefian A, Ziller E, Swartz J, Hartley D. Active Living for Rural Youth: Addressing Physical Inactivity in Rural Communities. J Public Health Manag Pract. 2009; 15(3):223–231. [PubMed: 19363402]

23. Israel BA, Cummings KM, Dignan MB, et al. Evaluation of health education programs: Current assessment and future directions. Health Education Quarterly. 1995; 22(3):364–389. [PubMed: 7591790]

24. Windsor, R.; Baranowski, T.; Clark, N.; Cutter, G. Evaluation of Health Promotion, Health Education, and Disease Prevention Programs. Second. Mountain View, CA: Mayfield Publishing Company; 1994.

25. Economic Research Services. Rural Definitions: Data Documentation and Methods. Available at http://www.ers.usda.gov/Data/RuralDefinitions/documentation.htm. Accessed January 11, 2012

26. United States Census Bureau. Census 2000 Urban and Rural Classification. Available at http://www.census.gov/geo/www/ua/ua_2k.html. Accessed January 11, 2012

27. Glasgow RE, Marcus AC, Bull SS, Wilson KM. Disseminating effective cancer screening interventions. Cancer. 2004; 101(5 suppl 5):1239–1250. [PubMed: 15316911]

28. Glasgow RE, Lichtenstein E, Marcus AC. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. Am J Public Health. 2003; 93(8):1261–1267. [PubMed: 12893608]

29. Green LW, Glasgow RE. Evaluating the relevance, generalization, and applicability of research: issues in external validation and translation methodology. Eval Health Prof. 2006; 29(1):126–153. [PubMed: 16510882]

30. Strauss, A.; Corbin, J. Basics of qualitative research. 2nd. Thousand Oaks, CA: Sage Publications; 1998.

31. Miles, M.; Huberman, A. Qualitative data analysis. 2nd. Thousand Oaks, CA: Sage Publications; 1994.

32. Lincoln, Y.; Guba, E. Naturalistic Inquiry. Thousand Oaks, CA: Sage Publications; 1985.

33. US Department of Health and Human Services. Disparities. Available at http://healthypeople.gov/2020/about/DisparitiesAbout.aspx. Accessed April 18, 2011

34. Brownson RC, Fielding J, Maylahn C. Evidence-based public health: a fundamental concept for public health practice. Annu Rev Public Health. 2009; 30:175–201. [PubMed: 19296775]

35. Levi, J.; Juliano, C.; Segal, LM. F as in Fat: How obesity policies are failing in America. Washington, DC: Trust for America's Health; 2006.

36. Brownson, RC.; Baker, EA.; Leet, TL.; Gillespie, KN.; True, WR. Evidence-Based Public Health. 2nd. New York, NY: Oxford University Press; 2011.

37. Khan LK, Sobush K, Keener D, et al. Recommended community strategies and measurements to prevent obesity in the United States. MMWR Recomm Rep. 2009; 58:1–26. [PubMed: 19629029]

38. Hartley D. Rural health research: building capacity and influencing policy in the United States and Canada. Can J Nurs Res. 2005; 37(1):7–13. [PubMed: 15887762]

39. Bellamy GR, Bolin JN, Gamm LD. Rural Healthy People 2010, 2020, and beyond: the need goes on. Fam Community Health. 2011; 34(2):182–188. [PubMed: 21378515]

40. Rychetnik L, Hawe P, Waters E, Barratt A, Frommer M. A glossary for evidence based public health. J Epidemiol Community Health. 2004; 58:538–545. [PubMed: 15194712]

41. Brennan L, Castro S, Brownson R, Claus J, Orleans T. Accelerating and Broadening Evidence Standards to Identify Effective, Promising, and Emerging Policy and Environmental Strategies for Prevention of Childhood Obesity. Annu Rev Public Health 2011. 2010; 32(25):1–25.

42. Guide to Community Preventive Services. Promoting physical activity: environmental and policy approaches. Available at: www.thecommunityguide.org/pa/environmental-policy/index.html. Accessed January 30, 2012

43. Higgins, JPT.; Green, S., editors. Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0. The Cochrane Collaboration. 2011. Available at: www.cochrane-handbook.org. Accessed February 2, 2012

44. National Institute for Clinical Health and Clinical Excellence. Promoting and creating natural or built environments that encourage and support physical activity. Available at: www.nice.org.uk. Accessed February 1, 2012

Table 1

Environmental and Policy Interventions Being Planned or Implemented by Key Informants' Communities

Type of Environmental or Policy Intervention	# Interventions Cited	# Unique Sites Citing Intervention Category
Physical Activity		
Creation or expansion of walking trails	9	9
Sidewalk completion or enhancement	9	5
Bicycle lanes or enhanced bicycle facilities	8	4
Safe Routes to School	5	5
School recess policies (eg, recess before lunch)	2	2
Other	4	3
Total Physical Activity	37	N/A
Healthy Eating		
Community garden	4	4
Farmers' market	4	4
Locally grown foods offered in schools	2	2
Vending machine changes	2	2
School garden	1	1
Improved school lunch	1	1
Menu board nutritional information	1	1
Other	6	3
Total Healthy Eating	21	N/A

Table 2

Barriers to Environmental or Policy Interventions to Promote Physical Activity and/or Healthy Eating in Rural Communities

Barrier	Example of a Supporting Quote
Population size	We don't have a lot of influence when it goes to the state level if we're trying to influence state policies because we're such small communities.
Human capital	One of the challenges that I would say that we have is just a basic workforce challenge that I think is fairly cross-cutting for rural communities in general. I'm the only one in our department that has an actual degree in public health and fewer than 10% of adults in my county have completed any form of college education, so we're not, you know, most of our community partners don't necessarily have a lot of in-depth education or formal education and sort of the jobs that they're doing so they may not have necessarily be exposed to the way this idea and research in the built environment or coordinated school health or promoting worksite wellness and all that. So a lot of what my challenges have been has been building things from scratch.
Culture	They're [rural people] more independent and they really don't want government messing with them.
Evidence from urban and suburban contexts	Factories are located on the edge of town. Even if you live in the city [in a rural community] you live separate from that, and it's not necessarily a walkable community kind of experience to go to work. A lot of people who live in the city [in a rural community], work outside of the county, and a lot of people who work in the city [in the rural community] live in the out-county area. So, I think the average commute time is right around 21 minutes.
Leadership	Getting city council to think of [environmental and policy change around health] as an opportunity, not just to improve our economy and to promote economic development but also to promote a community where people are active and walk and bicycle more, that's been more of a challenge. And not necessarily a challenge in the sense that I've encountered a lot of resistance; it's just a challenge in that it's a new way of thinking for a lot of people.

Table 3

Strategies to Overcome Barriers to Environmental or Policy Interventions to Promote Physical Activity and/or Healthy Eating in Rural Communities

Strategy to Overcome Barriers	Example of a Supporting Quote
Develop a broader-based partnership	If you have silos within an organization that only care about their own area of interest, you really can't look at a broad-based approach to solving problems that involve concerns that the population has with safety, access, education gaps, school districts that are under the gun to provide a kind of a narrow range of services and maybe healthy eating isn't anywhere on the list. So you know, to break that down, you really need to create an environment of collaboration before you do much of anything.
Build on what currently exists	So, trying to look for ways in town and regional planning organizations to insert language into the regional plan that promotes opportunities for physical activity. So that if the developer comes in and wants to build a housing subdivision, they're already thinking before they put their houses in that they should have a trail system in place.
Become an expert	If a new development comes up, a planned unit development, they send me the preliminary design concepts for that development for me to review and make comments on before they actually approve that development design.
Focus on long-term vision	We understand that it takes money today, but what we want you to start to think about is, what do we need 20 years from now? What do we want our town to look like 20 years from now?

Table 4

Types of Partners Important to Environmental and Policy Change to Promote Physical Activity and/or Healthy Eating

Type of Partner	# of Key Informants Cited as Important
City or County Council member or Mayor	12
Business leaders or Chamber of Commerce members	11
School districts	11
Existing health promotion groups (eg, school health council)	10
Hospitals or health care providers	10
University/colleges	9
Health department	7
Faith communities	5
Parks and recreation department	5
Community-based organizations	4
Community enthusiast	4
Planners – city/county	4
State Government (eg, senator, representative)	4
Older adult community leaders	3
Community service organizations (eg, Rotary Club)	2
Corrections Department	2
Environmentalists	2
Food service organizations	2
Local racial/ethnic minority community leaders	2
Transportation department	2